



NATIONAL RADIO ASTRONOMY OBSERVATORY

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**Before the
Federal Communications Commission
Washington, D.C. 20554**

In the Matter of)
)
Office of Engineering and Technology seeks) ET Docket No. 18-70
comment on Google's request for waiver of)
Section 15.255(c)(3) of the Commission's)
rules for radars used for interactive motion)
sensing in the 57 – 64 GHz band)

Comments of the National Radio Astronomy Observatory

Introduction

1. Here, the National Radio Astronomy Observatory (NRAO) provides comments responding to the Commission's request for comment on Google's proposed waiver of Section 15.255(c)(3) of the Commission's rules for radars used for interactive motion sensing in the 57 – 64 GHz band.
2. The National Radio Astronomy Observatory and its sister observatories the Green Bank Observatory (<http://greenbankobservatory.org/>) and the Long Baseline Observatory (<https://public.lbo.us>) are operated by Associated Universities, Inc. (<http://www.aui.edu>) under cooperative agreement with the National Science Foundation. Their facilities include the Jansky Very Large Array (VLA) in New Mexico, the 100m Robert C. Byrd Green Bank Telescope (GBT) in West Virginia and the 10-element Very Long Baseline Array (VLBA) that is distributed from St. Croix to Hawaii. The higher-lying bands discussed here are also used at the University of Arizona Radio Observatory (ARO) Kitt Peak 12m and Mt. Graham SMT facilities.
3. NRAO has previously filed comments with the Commission regarding use of the 57 – 64 GHz band (GN Docket No. 14-177) as reflected in Section 6 of the Report and Order in this matter, FCC 16-89. Field disturbance sensors of the sort at issue here are discussed in Section 6b and beyond. NRAO's present remarks are related to those made earlier, in matters giving rise to similar concerns.

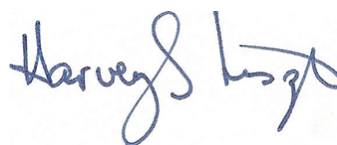
The 57 – 64 GHz Band is the right one for such devices, with some caveats

4. Terrestrial radio astronomy observations cannot be conducted in this band owing to the high opacity of telluric O₂, which even at the highest-altitude astronomical observatory at 5,000m is 80 dB at 57 GHz or 26 dB at 64 GHz. Radiation in the 57 – 64 GHz band is efficiently trapped, making spectrum re-use possible over comparatively short paths.
5. The same cannot be said, however, for the 2x and 4x harmonics of radiation in the 57-64 GHz band, which overlap the passive service bands at 114.25–116 and 226–231.5 GHz that are protected by US246 and RR. No. 5.340. The 114.25–116 GHz band is also subject to US 74. Radiation in these higher-lying bands propagates relatively freely, so radio astronomy operations in those bands stand to be affected by use of these devices, especially airborne use. Radiation that interferes with radio astronomy operations in the passive band around 230 GHz is not subject to US 74, so there should not be any harmful interference whatsoever into this band. The Commission is urged to take whatever steps are needed to protect the use of the 115 and 230 GHz bands.

Airborne use of these devices should not be permitted

6. Reviewing the record, the Commission decided not to allow airborne use of 60 GHz WiFi, as discussed at 327-333 of the Report and Order. The increased power and eirp levels requested by Google are, in the study Google submitted, shown to emit at levels that compete with 60 GHz WiFi signals. It therefore stands to reason that the field disturbance sensors proposed by Google should also not be used in-flight, for the same reasons. It is possible that more study, which has lapsed, might change this situation.
7. There is no indication that 60 GHz WiFi-equipped computers actually know when they are airborne, or that the use of 60 GHz WiFi on such devices is curtailed when they are used in-flight. 60 GHz WiFi has peer-peer applications that might cause the WiFi to be engaged even in the lack of 60 GHz infrastructure on the plane.

Respectfully submitted,
National Radio Astronomy Observatory



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